

CLAIMS

We claim:

- 1           1. A method comprising:  
 2           determining a target of a branch instruction;  
 3           storing the target of the branch instruction before the branch instruction is fully  
 4 executed; and  
 5           re-encountering the branch instruction and predicting a target for the branch  
 6 instruction by accessing the stored target for the branch instruction.
- 1           2. The method of Claim 1, wherein the branch instruction is a direct branch.
- 1           3. The method of Claim 1, wherein the branch instruction is a backward branch.
- 1           4. The method of Claim 1, wherein storing the target comprises saving the target to  
 2 a cache.
- 1           5. The method of Claim 4, wherein the target of the branch instruction is also stored  
 2 in a branch prediction unit after the branch instruction has been fully executed.
- 1           6. The method of Claim 5, wherein the target is predicted for the branch instruction  
 2 before the target of the branch instruction is stored in the branch prediction unit.
- 1           7. The method of Claim 6, wherein predicting a target for the branch instruction  
 2 comprises:  
 3           accessing at least one target stored in at least one of the cache and the branch  
 4 prediction unit;  
 5           prioritizing the accessed targets; and  
 6           generating a branch prediction based on the prioritized targets.
- 1           8. An apparatus comprising:  
 2           a decoder to determine a target of a branch instruction;  
 3           a cache to store the target of the branch instruction before the branch instruction is  
 4 fully executed; and  
 5           a branch prediction unit to, upon re-encountering the branch instruction, predict the  
 6 target of the branch instruction by accessing the target of the branch instruction stored in the  
 7 cache.
- 1           9. The apparatus of Claim 8, wherein the decoder determines a target of a direct  
 2 branch instruction.

1 10. The apparatus of Claim 8, wherein the decoder determines a target of a  
2 backward branch instruction.

1 11. The apparatus of Claim 8, wherein the branch prediction unit also stores the  
2 target of the branch instruction after the branch instruction has been fully executed.

1 12. The apparatus of Claim 11, wherein the branch prediction unit predicts the  
2 target for the branch instruction before the target of the branch instruction is stored in the  
3 branch prediction unit.

1 13. The apparatus of Claim 12, wherein the branch prediction unit predicts the  
2 target for the branch instruction by:

3 accessing at least one target stored in at least one of the cache and the branch  
4 prediction unit;

5 prioritizing the accessed targets; and

6 generating a branch prediction based on the prioritized targets.

1 14. A system comprising:

2 a processor capable of pipelining instructions;

3 a decoder to determine a target of a branch instruction to be executed by the  
4 processor;

5 a cache to store the target of the branch instruction before the branch instruction is  
6 fully executed by the processor; and

7 a branch prediction unit to, upon re-encountering the branch instruction, predict the  
8 target of the branch instruction by accessing the target of the branch instruction stored in the  
9 cache.

1 15. The system of Claim 14, wherein the decoder determines a target of a direct  
2 branch instruction.

1 16. The system of Claim 14, wherein the decoder determines a target of a backward  
2 branch instruction.

1 17. The system of Claim 14, wherein the branch prediction unit also stores the  
2 target of the branch instruction after the branch instruction has been fully executed.

1 18. The system of Claim 17, wherein the branch prediction unit predicts the target  
2 for the branch instruction before the target of the branch instruction is stored in the branch  
3 prediction unit.

- 1           19. The system of Claim 18, wherein the branch prediction unit predicts the target
- 2   for the branch instruction by:
- 3           accessing at least one target stored in at least one of the cache and the branch
- 4   prediction unit;
- 5           prioritizing the accessed targets; and
- 6           generating a branch prediction based on the prioritized targets.

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